

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Hilti AG
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-HIL-20230038-IBA1-EN
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Valid to	09.02.2028

HIT-HY 200-A V3
Hilti AG

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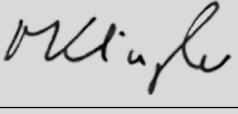
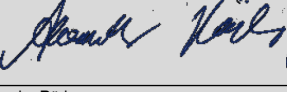
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1. General Information

Name of the manufacturer Programme holder IBU – Institut Bauen und Umwelt e.V. Hegelplatz 1 10117 Berlin Germany	Name of the product Owner of the declaration Hilti AG Feldkircher Str. 100 FL-9494 Schaan Liechtenstein
Declaration number EPD-HIL-20230038-IBA1-EN	Declared product / declared unit The declared product is a HILTI injectable mortar HIT-HY 200-A V3. The declared unit is one kilogram of reaction resin product in the mixing ratio of the two components necessary for processing. The packaging is also included in the calculation. The declared unit is stated in [kg].
This declaration is based on the product category rules: Reaction resin products, 01.2019 (PCR checked and approved by the SVR)	Scope: This document refers to the injectable mortar HIT-HY 200-A V3 with its packaging. For the compilation of the life cycle assessment, specific data were collected from the factory in Kaufering, Germany, of the HILTI AG. Since the production of this product has only just started in 2022, no annual average consumption can be used. The input and output flows used in this calculation were therefore measured directly by the manufacturer for this production process for a comparable product.
Issue date 10.02.2023	The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences. The EPD was created according to the specifications of <i>EN 15804+A2</i> . In the following, the standard will be simplified as <i>EN 15804</i> .
Valid to 09.02.2028	Verification The standard <i>EN 15804</i> serves as the core PCR Independent verification of the declaration and data according to <i>ISO 14025:2011</i> ☐ internally ☒ externally
 Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	 Matthias Klingler (Independent verifier)
 Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.)	

2. Product

2.1 Product description/Product definition

The declared product of HIT-HY 200-A V3 is a two-component system.

The resin component (component A) comprises a resin based on methacrylate as well as mineral and cement-like fillers. The curing agent component (component B) comprises peroxide hardener, water and mineral fillers. Mixing the two components A and B in the static mixer initiates the curing (hardening) reaction of both binder systems. During the curing phase, a very strong bond is formed between the organic and inorganic binder matrix.

The hybrid system formed during cement and resin curing results in a crosslinked duomer with desired design properties (high bond strengths within a short curing time) and particular long-term stability.

Composite foils are used for the two-component foil pack of HIT-HY 200-A V3. This kind of packaging serves the following purposes: waste volume reduction, easy storage and transport, and less packaging material.

Through legislation and increased public awareness users have increasingly become discerned towards the use of styrene and other highly volatile components with their resulting unpleasant odour and low flash point (flammability).

The reaction resins used in all Hilti hybrid adhesives contain no styrene, are practically odourless and have a considerably higher flash point, i.e. higher than 100° C in comparison to 34° C for styrene-based products.



HIT-HY 200-A V3 is a premium performance injectable hybrid mortar with approvals for rebar connections and heavy duty anchoring.

For the placing of the product on the market in the European Union European Free Trade Association EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration the following European Technical

Approvals

ETA 18/0972

ETA 18/0978

ETA 19/0600

ETA 19/0601

ETA 19/0632

ETA 19/0665

and the CE marking. For the application and use the respective national provisions apply.

2.2 Application

Hilti HIT-HY 200-A V3 serves for safely securing of threaded rods and postinstalled rebar connections in cracked and uncracked concrete C20/25 to C50/60. HIT-HY 200-A V3 has ETAs including seismic C1 and C2 performance for anchoring and fire data for rebar and anchoring designs. It also holds international code council (ICC) approvals for static and A-F seismic designs.

Hilti HIT-HY 200-A V3 is a component of the Hilti SAFEset concept. Hilti SAFEset is an approved system which makes anchor installation an easier, safer and faster process. It significantly improves the robustness of fastening and dramatically reduces the possibilities of error during installation. As part of SAFEset HIT-HY 200-A V3 can be installed with approved Hilti Hollow Drill bits and vacuum cleaners that drill and clean the hole in one step for virtually dust-free installation. When used with Hilti HIT-Z rod as part of the SAFEset, no cleaning of the borehole is required. The use of Hilti HDE dispensers with the Volume Calculator app leads to no under or over fill, reducing underfilling related risks and minimizing mortar wastage.

2.3 Technical Data

Constructional data

Name	Value	Unit
Density EN ISO 1183-1	1830	kg/m ³
Compressive strength (T _{cure} =120h) EN ISO 604	92	N/mm ²
Elastic modulus (pressure) EN ISO 604	2900	N/mm ²
Tensile shear strength acc. to DIN EN 14293	not relevant	N/mm ²
Tensile bond strength acc. to DIN EN 14293	not relevant	N/mm ²

Hilti HIT-HY 200-A V3 displays the following characteristics:

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to

ETA 18/0972

ETA 18/0978

ETA 19/0600

ETA 19/0601

ETA 19/0632

ETA 19/0665

ICC ESR-4878

ICC ESR-4868

Shelf life of 12 months:

Substrate temperature during installation -10 to +40 °C (internal method).

Working time:

-10 to -5 °C	90 min
> -5 to 0 °C	50 min
> 0 to +5 °C	25 min
> 5 to +10 °C	15 min
> 10 to +20 °C	7 min
> 20 to +30 °C	4 min
> 30 to +40 °C	3 min

Curing time:

-10 to -5 °C	7 h
> -5 to 0 °C	4 h
> 0 to +5 °C	2 h
> 5 to +10 °C	75 min
> 10 to +20 °C	45 min
> 20 to +30 °C	30 min
> 30 to +40 °C	30 min

2.4 Delivery status

The product Hilti HIT-HY 200-A V3 is available in foil-packages with a total of 330 ml and 500 ml injectable mortar in the corresponding mixing ratio.

2.5 Base materials/Ancillary materials

Hilti HIT-HY 200-A V3 is supplied in the form of a dual component film-wrapped pack comprising a resin component and a curing agent component at a volume ratio of 5:1. The mixing ratio of resin and curing agent components is automatically set during the injection process. Product curing commences directly after the components are mixed.

The product reviewed in this EPD contains the following component volumes:

Resin component:

Methacrylate resin mixture: 30 to 40% by weight

Mineral fillers: 40 to 50% by weight

Cement: 10 to 20% by weight

Other: < 5% by weight

Curing agent component:

Mineral fillers: 40 to 50% by weight

Aluminium oxide: 15 to 25% by weight

Water: 15 to 25% by weight

Dibenzoyl peroxide: 10 to 15% by weight

Other: < 5% by weight

This product article contains substances listed in the candidate list (date: 15.11.2022) exceeding 0.1 percentage by mass: no.

This product contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: no.

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no.

2.6 Manufacture

Most raw materials are sourced in Europe. The transport is exclusively by truck for the European raw materials, and by truck and by ship for the others. Chemical mortars are usually two-component systems consisting of a binder and a hardener. One of the base components of the binder is the reactive resin which in the case of HIT-HY 200-A V3 is produced in Kaufering. The resin production process is a chemical reaction of the corresponding educts to a basic resin with subsequent mixing of the basic resin with different reactive diluents to a reactive resin. This process is controlled and monitored by process control technology.

The production of chemical mortars consists of a mixing process and a filling process of the respective single components (binder and hardener) and their subsequent union to a two-component system (packaging). Here as well process control technology is used to weigh and mix solid and liquid compounds according to the specification. In the next step both well-mixed components run through an automated filling line in which each of the processed masses is filled into a tubular foil bag. Finally, the single components are combined in one packaging unit. The two-pack foil bags are packed into cardboard boxes and then finally shipped.

The manufacturing plant of HIT-HY 200-A V3, Hilti GmbH Industriegesellschaft für Befestigungstechnik, Hiltistr. 6, 86916 Kaufering, Germany, is certified according to *ISO 9001*. The guideline defines international standards for quality and process management.

2.7 Environment and health during manufacturing

The manufacturing plant of HIT-HY 200-A V3, Hilti GmbH Industriegesellschaft für Befestigungstechnik, Hiltistr. 6, 86916 Kaufering, Germany, is certified according to *ISO 14001* which defines international standards for sustainable environmental management. The production site is also certified in accordance with *ISO 50001* Energy Management Systems.

2.8 Product processing/Installation

The product is delivered with Instructions for Use explaining the basic steps for installation:

- 1) For safe handling the precautionary measures described in the SDS (e.g. hand and eye protection) must be adhered to
- 2) Insert the cartridge into the red cassette
- 3) Screw on the mixing nozzle
- 4) Put the cassette into the dispenser system
- 5) Discard the first trigger pulls
- 6) Fill 2/3 of the borehole with mortar
- 7) Set the fixing element

After mixing the components and squeezing the mortar into the borehole the fixing element has to be set within the working time mentioned in Instructions for Use. After the curing time, described as well in Instructions for Use, the mortar is ready to take up loads.

2.9 Packaging

Hilti HIT-HY 200-A V3 is supplied in the form of a 2-foil-pack system and thus leads to very little waste remaining after use on the construction site. After curing, the product can be disposed of with household waste. Full or only partially emptied cartridges must be disposed of as special waste in accordance with official regulations.

The outer packaging consisting of plastic foil and cardboard boxes designed according to the product size can be recycled. Packaging contaminated by the product must be disposed in a safe manner in accordance with local/national regulations.

2.10 Condition of use

During the installation the temperature of the base material must be between -10° C and +40°C. The temperature of the product should be between 5 - 25 °C during storage and 0 - 40° C during installation. Hilti literature and official approvals must always be considered. The two components of HIT-HY 200-A V3 are only for use in combination with the defined volume ratio and under the conditions mentioned above to build up a cross-linked filled duomer.

2.11 Environment and health during use

Refer to the Safety Data Sheet (SDS) for detailed information on handling, storage as well as first aid, firefighting and accidental release measures and disposal considerations. Following the given instructions help to minimize the risk to health and environment.

2.12 Reference service life

Hilti HIT-HY 200-A V3 is exposed to a wide variety of environmental factors during the use phase. The anticipated Reference Service Life depends on the specific installation situation and the product exposure scenario. The main factors influencing the period of use involve weathering as well as mechanical loads and chemical exposure.

Description of the influences on the ageing of the product when applied in accordance with the rules of technology.

2.13 Extraordinary effects

Fire

Even without any special fire safety features the Injection Systems comply with at least the requirements of the *DIN EN 13501-1* standard for fire classes E and Efl. As cross-linked methacrylate resins do not melt or drip, the resins do not contribute towards spreading fire. Apart from the common combustion produces carbon monoxide and carbon dioxide, fire gases can contain traces of methyl methacrylate, esters, alcohol, and hydrocarbons. Due to the quantities used, they only have a subordinate influence on the fire characteristics of a building structure in which they have been installed.

Fire protection

Name	Value
Building material class	E/Efl
Burning droplets	No performance assessed
Smoke gas development	No performance assessed

Water

The cured product is chemically inert and insoluble in water. HIT-HY 200-A V3 is certified for use as an anchoring adhesive in concrete for water treatment applications according to National Sanitation Foundation (US) /NSF/.

Mechanical destruction

It is recommended to use dust protection during the demolition of the cured chemical anchor.

2.14 Re-use phase

The product cannot be reused. After usage the product can be removed by demolition.

2.15 Disposal

Uncured Hilti HIT-HY 200-A V3 can be disposed of according to the European waste code 08 04 09* or 20 01 27*. The built-in cured anchor can be disposed as construction waste for which the European waste code 17 01 01 applies.

2.16 Further information

Further information is available on request under anchor.hse@hilti.com and on the Hilti website: www.hilti.group

3. LCA: Calculation rules

3.1 Declared Unit

The product declared here is an injection mortar from HILTI AG with the designation HIT-HY 200-A V3. The declared unit refers to 1 kg reaction resin product in the mixing ratio of the two components required for processing. The packaging, based on 1 kg of reaction resin product, is also calculated at 0.114 kg. The table below shows the data of the declared unit.

Declared unit

Name	Value	Unit
Declared unit	1	kg
Conversion factor to 1 kg	1	

3.2 System boundary

Type of EPD: cradle to gate with options. The following information modules are defined as system boundaries in this study:

Production stage (A1- A3):

- A1, raw material extraction,
- A2, transport to manufacturer,
- A3, manufacture.

End of life (C1- C4):

- C1, dismantling/demolition,
- C2, transportation,
- C3, waste treatment,
- C4, elimination.

Reuse, recovery and recycling potential (D)

In order to precisely record the indicators and environmental impacts of the declared unit, a total of 8 information modules are considered. The information modules A1 to A3 describe the provision of materials, the transport to the production site and the production processes of the product itself.

The primary products are sourced from the European Union and Asia. Transport is by truck and ship. The following flow charts illustrate the underlying production process.

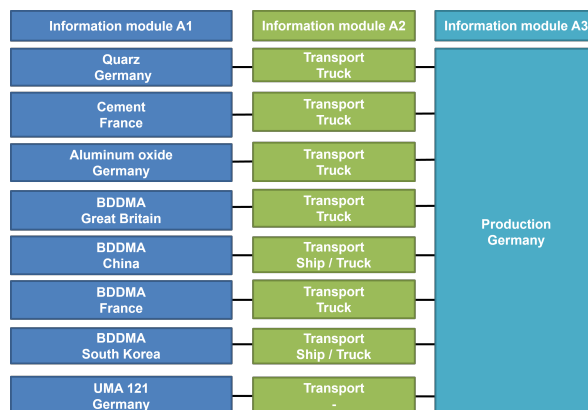


Illustration 1: Information module A1 to A3 of product (part 1)

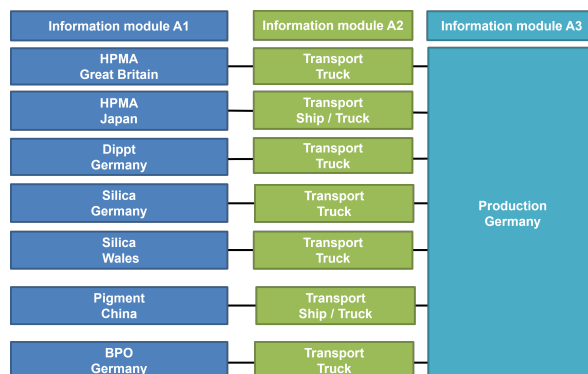


Illustration 2: Information module A1 to A3 of product (part 2)

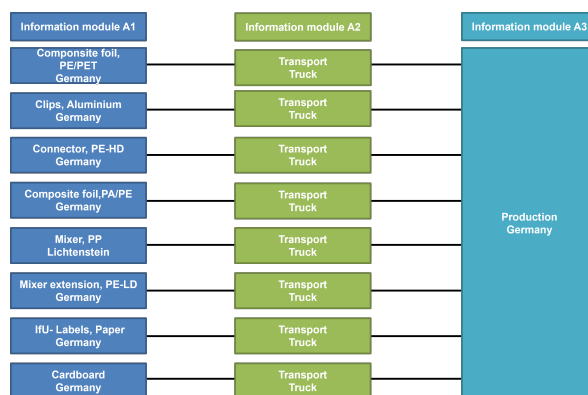


Illustration 3: Information module A1 to A3 of packaging

3.3 Estimates and assumptions

The electricity mixes and other background data are calculated country-specifically for the production processes.

For Dippt and Heliogen Blue L, an assumption was made for the calculation of the material supply. This assumption is based on manufacturer data. No assumptions or limitations were made for other formulation contents or processes.

3.4 Cut-off criteria

All energy and mass inputs were taken into account. The cut-off criterion according to *EN 15804+A2* is not applied.

3.5 Background data

The database of the background data of the *GaBi 10* and *ecoinvent 3.8* databases, to which this study also refers, is documented under the following link. (Sphera).

3.6 Data quality

For the compilation of the life cycle assessment, specific data were collected from the factory Kaufering, in Germany, of the HILTI AG from the year 2022. The background data from the *GaBi 10 database* used is from the year 2022 and thus of high relevance. The mass of the different components of the reactive resin mixture come from the information to the recipe. The data quality is classified as appropriate.

3.7 Period under review

As production of this product only started in 2022, no annual average consumption can be used. The input and output flows used in this calculation were therefore measured directly by the manufacturer for this production process for a comparable product.

3.8 Allocation

Allocation of co-products takes place in the information modules A1-A3.

The production waste of the injection-moulded components is thermally recovered. The electrical and thermal energy credits resulting therefrom are completely charged in modules A1-A3. No further allocations are made.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

The database with the background data of the *GaBi 10* and *ecoinvent 3.8* databases, to which this study also refers, is documented under the following link. (Sphera).

4. LCA: Scenarios and additional technical information

Characteristic product properties

Information on biogenic carbon

No renewable raw materials are used in the product. Therefore, the biogenic carbon is shown as zero. The following raw materials contain biogenic carbon in the packaging.

Information on describing the biogenic Carbon Content at factory gate

Name	Value	Unit
Packaging Cardboard Box	0,0154	kg C
Packaging IfU-Labels, Paper	0,0101	kg C

Information on packaging

Name	Value	Unit
Composite foil PE/PET (foil bags)	0,0078	kg
Clips, Aluminium	0,0027	kg
Connector PE-HD	0,0123	kg
Composite foil PA/PE (outer packaging)	0,0094	kg
Mixer, PP	0,0186	kg
Mixer extension, PE-LD	0,0045	kg
IfU- Labels, Paper	0,0235	kg
Cardboard box	0,0360	kg

End of life (C1-C4)

The product is demolished using an electric chisel. The electrical energy consumption for the tool is assumed to be 0.05 MJ for the declared unit. The electricity consumption is calculated with a European

electricity mix. The construction waste is transported by truck 50 km to the waste treatment plant. The construction waste is shredded in the waste treatment plant and then dumped.

Name	Value	Unit
Collected as mixed construction waste	1	kg
Crushing in the shredder	1	kg
Landfilling	1	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

In this calculation there are no reuse, recovery and recycling potentials. Therefore, the information module D is declared and shown as zero.

Name	Value	Unit
Reuse, recovery and recycling potentials	0	kg

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kg HILTI HIT-HY 200-A V3

Core Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential - total	[kg CO ₂ -Eq.]	2.50E+0	5.12E-3	3.76E-3	2.60E-3	1.45E-2	0.00E+0
Global warming potential - fossil fuels	[kg CO ₂ -Eq.]	2.50E+0	5.12E-3	3.74E-3	2.59E-3	1.45E-2	0.00E+0
Global warming potential - biogenic	[kg CO ₂ -Eq.]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
GWP from land use and land use change	[kg CO ₂ -Eq.]	1.27E-3	1.08E-6	2.07E-5	1.20E-5	2.67E-5	0.00E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	4.41E-8	7.50E-14	2.22E-16	3.85E-15	3.40E-14	0.00E+0
Acidification potential, accumulated exceedance	[mol H ⁺ -Eq.]	9.59E-3	1.12E-5	1.17E-5	1.34E-5	1.03E-4	0.00E+0
Eutrophication, fraction of nutrients reaching freshwater end compartment	[kg P-Eq.]	5.33E-4	1.49E-8	1.11E-8	7.43E-9	2.45E-8	0.00E+0
Eutrophication, fraction of nutrients reaching marine end compartment	[kg N-Eq.]	2.12E-3	2.52E-6	5.37E-6	6.11E-6	2.62E-5	0.00E+0
Eutrophication, accumulated exceedance	[mol N-Eq.]	2.07E-2	2.65E-5	6.01E-5	6.74E-5	2.88E-4	0.00E+0
Formation potential of tropospheric ozone photochemical oxidants	[kg NMVOC-Eq.]	6.60E-3	6.82E-6	1.05E-5	1.66E-5	7.97E-5	0.00E+0
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.76E-4	1.40E-9	3.10E-10	2.87E-9	1.48E-9	0.00E+0
Abiotic depletion potential for fossil resources	[MJ]	4.74E+1	9.29E-2	4.96E-2	5.06E-2	1.90E-1	0.00E+0
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m ³ world-Eq deprived]	7.06E-1	1.17E-3	3.33E-5	4.99E-4	1.59E-3	0.00E+0

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kg HILTI HIT-HY 200-A V3

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	4.96E+0	5.16E-2	2.82E-3	4.06E-3	2.85E-2	0.00E+0
Renewable primary energy resources as material utilization	[MJ]	9.50E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	5.91E+0	5.16E-2	2.82E-3	4.06E-3	2.85E-2	0.00E+0
Non-renewable primary energy as energy carrier	[MJ]	4.52E+1	9.30E-2	4.97E-2	5.07E-2	1.90E-1	0.00E+0
Non-renewable primary energy as material utilization	[MJ]	2.29E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	4.75E+1	9.30E-2	4.97E-2	5.07E-2	1.90E-1	0.00E+0
Use of secondary material	[kg]	6.55E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m ³]	1.98E-2	4.92E-5	3.19E-6	1.42E-5	4.82E-5	0.00E+0

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 kg HILTI HIT-HY 200-A V3

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	[kg]	2.10E-8	8.04E-12	2.38E-13	6.34E-13	9.75E-12	0.00E+0
Non-hazardous waste disposed	[kg]	4.34E-2	7.00E-5	7.13E-6	1.34E-5	9.71E-1	0.00E+0
Radioactive waste disposed	[kg]	5.40E-4	1.49E-5	6.13E-8	6.68E-7	2.11E-6	0.00E+0
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 kg HILTI HIT-HY 200-A V3

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Potential incidence of disease due to PM emissions	[Disease Incidence]	ND	ND	ND	ND	ND	ND
Potential Human exposure efficiency relative to U235	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
Potential comparative toxic unit for ecosystems	[CTUe]	ND	ND	ND	ND	ND	ND
Potential comparative toxic unit for humans - cancerogenic	[CTUh]	ND	ND	ND	ND	ND	ND
Potential comparative toxic unit for humans - not cancerogenic	[CTUh]	ND	ND	ND	ND	ND	ND
Potential soil quality index	[-]	ND	ND	ND	ND	ND	ND

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

The dominance analysis shows that the main causes of environmental impacts and indicators are to be found in information module A1. This is shown by the total global warming potential for material supply with approx. 92%, related to all information modules. For total non-renewable primary energy, the figure is approx. 95%.

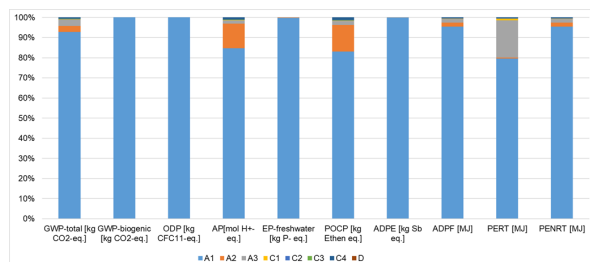


Illustration: Dominance analysis A1- A3

If we look at the material supply of the reaction resin mixture and the packaging in detail, it becomes clear which raw materials contribute decisively to the respective environmental impacts and indicators.

The reaction resin mixture itself has a share of 92% of the total global warming potential in information module A1. Approx. 2% is accounted for by the PE-HD of the connector and approx. 3% by the PP of the mixer.

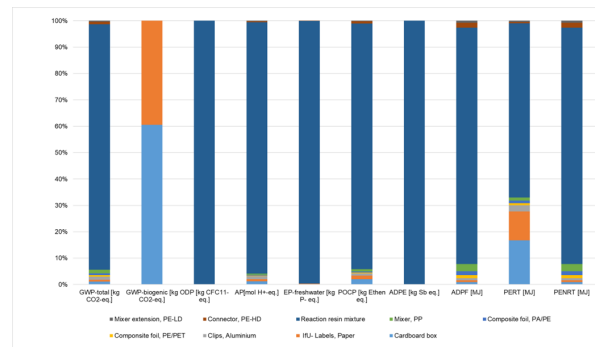


Illustration: Dominance analysis A1

Within the reaction resin mixture itself, the material supply of the BDDMA generates approx. 35% of the total global warming potential and approx. 36% of the total non-renewable primary energy. The UMA 121 has a share of approx. 27% of the total greenhouse gas emissions and approx. 29% of the total non-renewable primary energy.

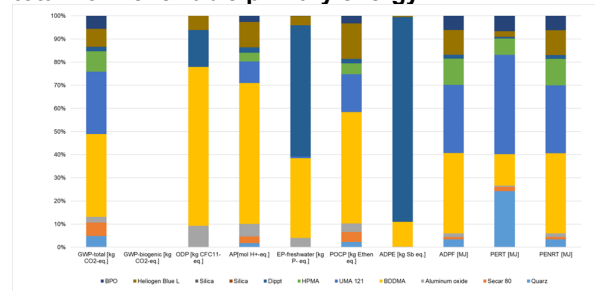


Illustration: Dominance analysis A1, reaction resin mixture

7. Requisite evidence

Hilti HIT-HY 200-A V3 complies with the requirements of

- *DIBt (2010)* in combination with the NIK values from *AgBB (2021)* for applications in interior areas,
- emission class A+ outlined in the *French VOC Directives (2011)* in accordance with the Eurofins attestation,
- *CDPH/EHLB Standard Method V 1.2 (2017)*

in accordance with *Eurofins test report, No. 392-2021-484601_C_EN*, *Eurofins test report, No. 392-2021-*

00484601_E_EN and *Eurofins test report, No. 392-2021-00484602_H_EN* respectively.

AgBB overview of results (28 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	<1000	µg/m³
Sum SVOC (C16 - C22)	<100	µg/m³
R (dimensionless)	<1	-
VOC without NIK	<100	µg/m³
Carcinogenic Substances	<1	µg/m³

AgBB overview of results (3 days [µg/m³])

Name	Value	Unit
VOC without NIK	<10000	µg/m³
Carcinogenic Substances	<10	µg/m³

8. References

DIN EN 13501-1



Klassifizierung von Bauprodukten und Bauarten zu ihrem Brandverhalten

DIN EN 14293

Klebstoffe - Klebstoffe für das Kleben von Parkett auf einen Untergrund Prüfverfahren und Mindestanforderungen

EN 15804

EN 15804:2012+A1:2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

EN 15804

EN 15804:2012+A2:2019, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

EN ISO 1183-1

DIN 51757:2011-01 Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method

EN ISO 604

DIN EN ISO 604:2003-12: Determination of compressive properties

ISO 14001

ISO 14001:2015 Environmental management systems Requirements with guidance for use

ISO 50001

ISO 50001: 2018 Energy management systems Requirements with guidance for use

ISO 9001

ISO 9001: 2015-11, Qualitätsmanagementsysteme - Anforderungen

AgBB (2021)

Vorgehensweise bei der gesundheitlichen Bewertung der Emissionen von flüchtigen organischen Verbindungen (VVO, VOC und SVOC) aus Bauprodukten (2021)

Candidate List of substances of very high concern for Authorisation

European Chemicals Agency (ECHA), in accordance with Article 50(10) of the REACH regulation

CDPH/EHLB/Standard Method V1.2

California CDPH Standard Method is a US standard for evaluating and restricting VOC emissions to indoor air. Developed in California as "Section 01350" Specification, several systems in the US refer to CDPH Standard Method

DIBt (2010)

Grundsätze zur gesundheitlichen Bewertung von Bauprodukten in Innenräumen (Oktober 2010)
Eurofins test report, No. 392-2021-00484601_C_EN
VOC test report for verification of compliance with DIBt(2010)/AgBB(2021)

Eurofins test report, No. 392-2021-00484601_E_EN

VOC test report for verification of compliance with the French VOC directive from 2011

Eurofins test report, No. 392-2021-00484602_H_EN

VOC test report for verification of compliance with CDPH/EHLB/Standard Method V1.2 (2017)

European Waste code

in accordance with the European Waste Catalogue (EWC) (EWC 2014/955/EU) Commission Decision amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council

ETA 18/0972

European Technical Approval Hilti HIT-HY 200-A V3 and Hilti HIT-HY 200-R V3

ETA 18/0978

European Technical Approval Hilti HIT-HY 200-A V3 and Hilti HIT-HY 200-R V3

ETA 19/0600

European Technical Approval Hilti HIT-HY 200-A V3 and Hilti HIT-HY 200-R V3

ETA 19/0601

European Technical Approval Hilti HIT-HY 200-A V3 and Hilti HIT-HY 200-R V3

ETA-19/0632

European Technical Approval Hilti HIT-HY 200-A V3 and Hilti HIT-HY 200-R V3

ETA 19/0665

European Technical Approval Hilti HIT-HY 200-A V3 and Hilti HIT-HY 200-R V3

French VOC Directives

Décret no 2011-321 du 23 mars 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils
Arrêté du 19 avril 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils

ICC ESR-4878

International code council (ICC), Evaluation report ESR-4878 HILTI HIT-HY 200 V3 (November 2021)

ICC ESR-4868

International code council (ICC), Evaluation report ESR-4868 HILTI HIT-HY 200 V3 (March 2022)

NSF

NSF/ANSI/CAN 61 Drinking Water System Components - Health Effects

ecoinvent 3.8

Background data: ecoinvent 3.8
Zürich: ecoinvent
<http://www.ecoinvent.org>
(21.11.2022)

IBU 2021

General Instructions for the EPD programme of Institut Bauen und Umwelt e.V. Version 2.0,
Berlin: Institut Bauen und Umwelt e.V., 2021
www.ibu-epd.de

**Calculation rules: PCR - Part A**

Institut Bauen und Umwelt e.V. (IBU), 2022. Product Category Rules for Building-Related Products and Services. Part A: Calculation rules for the life cycle assessment and requirements on the project report. Version 1.3 (08.2022)

Product category rules for construction products – Part B

Reaction resin products, 07.2014

Regulation (EU) No. 305/2011 (CPR)

Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying

down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC Text with EEA relevance

Sphera

GaBi 10 Software: Ganzheitliche Bilanzierung, Leinfelden-Echterdingen; Sphera Solution GmbH, <https://gabi.sphera.com/databases/gabi-data-search/> (21.11.2022)

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